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In the Claims:

1 1. (Currently amended) An apparatus for thermal sterilization  
2 of a microbiologically contaminated liquid to produce a  
3 thermally treated liquid, said apparatus comprising:

4 a pressure vessel enclosing a pressure space therein  
5 and having a vessel inlet and a vessel outlet;

6 a heater arranged in a heating zone in said pressure  
7 space within said pressure vessel; and

8 a heat exchanger arranged in said pressure vessel,  
9 having a heat exchanger inlet, a heat exchanger outlet and  
10 a heat exchange wall defining first and second flow paths  
11 along opposite sides of said heat exchange wall;

12 wherein at least one of said heat exchanger inlet and  
13 outlet is connected to at least one of said vessel inlet  
14 and outlet respectively, so that the contaminated liquid  
15 can flow into said pressure vessel through said vessel  
16 inlet, along said first flow path in a first net flow  
17 direction, and through said heating zone to ~~[[from]]~~ from  
18 the treated liquid, and the treated liquid can flow from  
19 said heating zone along said second flow path in a second  
20 net flow direction and out of said pressure vessel through  
21 said vessel outlet, while heat is transferred from the  
22 treated liquid to the contaminated liquid through said heat  
23 exchange wall.

1 2. (Original) The apparatus according to claim 1, wherein said  
2 heat exchanger is a counterflow heat exchanger, and the  
3 second net flow direction is opposite the first net flow  
4 direction.

1 3. (Original) The apparatus according to claim 2, wherein said  
2 heat exchanger is configured, dimensioned, arranged and  
3 adapted so that a substantial proportion of energy needed  
4 for heating the contaminated liquid is retained inside said  
5 pressure vessel by re-cooling of the treated liquid along  
6 said second flow path of said heat exchanger before the  
7 treated liquid exits said pressure vessel.

1 4. (Original) The apparatus according to claim 1, wherein only  
2 one of said heat exchanger inlet and outlet is connected to  
3 only one of said vessel inlet and outlet respectively at a  
4 distal end of said heat exchanger relative to said heating  
5 zone, and another of said heat exchanger inlet and outlet  
6 is open within said pressure space in said pressure vessel  
7 at a proximal end of said heat exchanger relative to said  
8 heating zone.

1 5. (Original) The apparatus according to claim 1, wherein said  
2 heat exchanger outlet is connected to said vessel outlet at  
3 a distal end of said heat exchanger relative to said  
4 heating zone, and said heat exchanger inlet is open within  
5 said pressure space in said pressure vessel at a proximal  
6 end of said heat exchanger relative to said heating zone.

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1 6. (Original) The apparatus according to claim 1, wherein said  
2 second flow path is bounded and enclosed by said heat  
3 exchange wall and thereby confined inside said heat  
4 exchanger, and said first flow path is a portion of said  
5 pressure space surrounding said heat exchanger within said  
6 pressure vessel.

1 7. (Original) The apparatus according to claim 1, wherein said  
2 heat exchanger has a hollow pipe-shape, and said heat  
3 exchange wall is a cylindrical pipe wall enclosing said  
4 second flow path therein.

1 8. (Original) The apparatus according to claim 1, wherein said  
2 heater is an electric resistance heater, and further  
3 comprising a temperature sensor arranged in said heating  
4 zone within said pressure vessel, and a power regulator  
5 connected to said temperature sensor to receive a  
6 temperature signal therefrom and connected to said electric  
7 resistance heater to apply thereto electrical power  
8 regulated dependent on the temperature signal.

1 9. (Original) The apparatus according to claim 1, further  
2 comprising a pressurizing pump outside of said pressure  
3 vessel connected to said vessel inlet.

- 1     **10.** (Original) The apparatus according to claim 9, further  
2           comprising a pressure-reducing device outside of said  
3           pressure vessel connected to said vessel outlet.
- 1     **11.** (Original) The apparatus according to claim 10, wherein  
2           said pressure-reducing device is connected for energy  
3           transmission to said pressurizing pump.
- 1     **12.** (Original) The apparatus according to claim 11, comprising  
2           a common shaft or a mechanical transmission by which said  
3           pressure-reducing device is connected to said pressurizing  
4           pump.
- 1     **13.** (Original) The apparatus according to claim 11, wherein  
2           said pressurizing pump and said pressure-reducing device  
3           together form a pressurizing-depressurizing module.
- 1     **14.** (Original) The apparatus according to claim 11, further  
2           comprising a drive motor connected to said pressurizing  
3           pump.
- 1     **15.** (Original) The apparatus according to claim 9, further  
2           comprising an excess pressure relief device connected to  
3           said vessel inlet parallel to said pressurizing pump.
- 1     **16.** (Original) The apparatus according to claim 1, further  
2           comprising a pressure-reducing turbine outside of said  
3           pressure vessel connected to said vessel outlet.

1 17. (Original) An apparatus for thermal sterilization of a  
2 microbiologically contaminated liquid, said apparatus  
3 comprising:

4 a pressure vessel enclosing a pressure space therein  
5 and having a vessel inlet and a vessel outlet;

6 a heater arranged in a heating zone in said pressure  
7 space within said pressure vessel;

8 a counterflow heat exchanger arranged in said pressure  
9 vessel, having a proximal end and a distal end relative to  
10 said heating zone, said proximal end being open to said  
11 pressure space within said pressure vessel, and said distal  
12 end being connected for flow communication with said vessel  
13 inlet or said vessel outlet; and

14 a pressurizing pump outside of said pressure vessel  
15 connected to said vessel inlet.

1 18. (Original) The apparatus according to claim 17, further  
2 comprising a pressure-reducing device outside of said  
3 pressure vessel connected for flow communication with said  
4 vessel outlet, and connected mechanically for power  
5 transmission to said pressurizing pump.

1 19. (Currently amended) A method of using the apparatus  
2 according to claim 1, for thermally sterilizing ~~[[a]]~~ the  
3 microbiologically contaminated liquid to produce ~~[[a]]~~ the  
4 thermally treated liquid, comprising the steps:  
5 a) pressurizing said contaminated liquid;

- 6           b)    flowing said contaminated liquid in [[a]] said first  
7               net flow direction along [[a]] said first [[side]]  
8               flow path of [[a]] said heat exchanger thereby  
9               pre-heating said contaminated liquid with heat  
10              transferred [[from]] through said heat exchange  
11              wall of said heat exchanger;  
12           c)    flowing said contaminated liquid through [[a]] said  
13               heating zone, and in said heating zone, heating said  
14               contaminated liquid with [[a]] said heater to a  
15               sufficiently high treatment temperature for achieving  
16               the thermal sterilization of said contaminated liquid  
17               to produce said thermally treated liquid;  
18           d)    flowing said thermally treated liquid in [[a]] said  
19               second net flow direction opposite said first net flow  
20               direction along [[a]] said second [[side]] flow path  
21               of said heat exchanger physically separated from and  
22               in thermal communication with said contaminated liquid  
23               [[on]] in said first [[side]] flow path of said heat  
24               exchanger, thereby cooling said thermally treated  
25               liquid by transferring heat from said thermally  
26               treated liquid to said heat exchanger; and  
27           e)    reducing a pressure of said thermally treated liquid.

1    20.   (Original) The method according to claim 19, wherein said  
2           step e) further comprises recovering energy from said  
3           reducing of said pressure, and then further comprising  
4           using said energy in performing said step a).

1     **21.** (Original) The method according to claim 19, wherein said  
2         treatment temperature in said step c) is above a normal  
3         atmospheric boiling point of said contaminated liquid, and  
4         said contaminated liquid is maintained in a liquid state  
5         because said contaminated liquid is pressurized to above  
6         atmospheric pressure in said step a).

1     **22.** (Original) The method according to claim 19, wherein said  
2         contaminated liquid is pressurized to a pressure of at  
3         least 16 bar in said step a) and said pressure is  
4         maintained in said steps b), c) and d), and wherein said  
5         treatment temperature in said step c) is at least 200°C.

**[RESPONSE CONTINUES ON NEXT PAGE]**

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